DEVELOPING A FRAMEWORK OF E-LEADERSHIP LITERACIES FOR TECHNOLOGY-ENHANCED LEARNING IN HIGHER EDUCATION: A DELPHI STUDY

Deborah Arnold, Albert Sangrà, Universitat Oberta de Catalunya, Spain

Summary

This paper presents the results of a Delphi study conducted as part of a doctoral research project on e-leadership literacies for technology-enhanced learning (TEL-eLL) in higher education (HE). The aim of the Delphi study is to answer the research question: "What are TEL-eLL?" In other words, how can we define the novel concept of TEL-eLL and how can we formulate the specific e-leadership literacies for TEL in the form of a meaningful framework.

After situating the research with respect to prior work on Leadership Literacies and e-leadership for TEL, the paper gives a detailed account of the design and results of the Delphi study conducted early 2018. Plans for further research applying the TEL-eLL framework are also outlined.

Introduction

The rationale behind the overall study is anchored in the still unsatisfactory integration of technology for teaching and learning in higher education (HE) and the hypothesis that one of the reasons for this is a lack of strategic thinking and leadership (Bates & Sangrà, 2011). The aim is thus to explore the attitudes, mindsets, understandings and behaviours of higher education decision-makers in relation to teaching and learning supported by technology, as well as their wider views on the societal and environmental impact of technology. The research is organised in three phases, the first of which, defining a framework of e-leadership literacies for technology-enhanced learning (TEL-eLL), is the focus of this paper. The following two phases involve applying this framework in three Mixed Methods case studies in European campus-based universities and analysing Leadership Development Programmes (LDPs) with the ultimate aim of formulating a series of recommendations to support universities in their integration of technology for teaching and learning.

The starting point for this study was to take the concept of Leadership Literacies as developed by Davis (2012) in order to explore how these could apply to TEL leadership, with particular reference to a framework for e-leadership for Technology-Enhanced Learning in Higher Education (Jameson, 2013). In order to validate both the definition and the content of the resulting novel concept of TEL-eLL an online Delphi study was carried out in three rounds between January and March 2018.

Methodology

Delphi studies are frequently used in research designed to develop competency frameworks, for example to identify leadership competencies for library directors and senior managers (Lewis, 2015) or skills for virtual team leaders (Whited, 2007).

The Delphi method originated in the 1950s (Dalkey & Helmer, 1963) as a means for reaching consensus among a group of experts, enabling anonymity of individual responses, revision of contributions by individuals and assessment of the group view (Linstone & Turoff, 1975; Pawlowski & Okoli, 2004). The Delphi method is of particular interest to research where judgmental information is indispensable (Pawlowski & Okoli, 2004). This is precisely the case here, where the proposed combination of Davis' (2012) leadership literacies and Jameson's (2013) e-leadership framework for TEL requires validation before commencing the following stages. Furthermore, mobilisation of external experts also minimises researcher bias (Lincoln & Guba, 1985).

Due to the iterative nature of Delphi studies through the successive rounds, the following sections present the different stages of the Delphi design as they took place, taking a chronological perspective in order to demonstrate how the analysis of each round informed the design of the following round.

Delphi Study design

Selection and invitation of experts

A total of 113 international experts were identified and invited from within the researchers own extensive networks and from key publications in the field of leadership for TEL in HE. The criteria for the selection of the experts were: significant knowledge and/or experience of (TEL) leadership in HE, knowledge of TEL in particular from a pedagogical rather than a technical perspective, coverage of both ODL and campus-based HE contexts, gender balance of the overall panel. A short document containing the theoretical background and rationale was prepared for the experts, who were contacted individually by email or via LinkedIn. Follow-up emails were sent to a number of those experts initially contacted via LinkedIn when a much lower response rate was noted in this group, suggesting that this channel, although providing a quick way of reaching out to people, was not particularly effective. At the end of the invitation process, 48 experts had agreed to participate, representing a response rate of 42.48%. 10 experts (8.85%) declined the invitation. 55 experts (48.67%) did not respond to the invitation.

Round 1: Survey design

While Delphi studies traditionally begin by eliciting proposals from experts in the first round, Hsu and Sandford (2007) note that "it is both an acceptable and a common modification of the Delphi process format to use a structured questionnaire in Round 1 that is based upon an extensive review of the literature." (Hsu & Sandford, 2007; p.2). This was thus the approach taken for the TEL-eLL Delphi study described here.

The aim of Round 1 was to:

- submit a working definition of TEL-eLL to experts in order to validate or refine it,
- ask experts to rate a series of 68 statements derived from the literature,
- ask experts to suggest improvements to the proposed statements,
- ask experts to suggest statements of their own to complete the framework.

In the first question, experts were thus asked whether they found the proposed working definition perfectly satisfactory, reasonably satisfactory or unsatisfactory.

The working definition of TEL-eLL presented to the Delphi experts was the following:

> *"a set of attitudes, understandings and mindsets which enable leaders in higher education to address complex problems relating to the integration of technology-enhanced learning and to solve them in ways which are respectful of people and the environment and which contribute to socio-economic development and to developing the capacity for social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change."*

Those who answered *reasonably satisfactory* or *unsatisfactory* were then asked to propose a reformulation. This question was repeated at the end of the questionnaire, to enable experts to revise their proposed reformulation after gaining better knowledge of the framework and its contents through completing the survey.

For the second part of the first round, a provisional TEL-eLL framework was developed based on Davis' (2012) Leadership Literacies for professional staff in universities, which provides the overarching dimensions, and Jameson's (2013) e-leadership framework for TEL (see Table 1). Other work which informed this included Johansen's (2012) leadership skills for an uncertain world, Sheninger's (2014) seven pillars of digital leadership, Belshaw's (2014) digital literacies, Ahlquist's (2014) ten competencies of a digital leader, Beaudoin's (2016) recommendations for distance education decision makers in HE, the work of the C-DELTA project in developing a curriculum for Digital Education Leadership (Brown, Czerniewicz, Huang, & Mayisela, 2016), Appreciative Leadership (Orr & Cleveland-Innes, 2015). Some of the original definitions were modified slightly to adapt them to the specific context of TEL or to align them with the notion of literacies, and so some evolution of their initial meaning was unavoidable.

This resulted in 68 literacy statements, which experts were asked to rate on a 5-point Likert scale from 1 = *highly important* to 5 = *not at all important*. They were encouraged to think of a governance-level TEL leader that they knew (or to think of themselves if they held or had held such a position) in order to situate these literacies in real-world practice. All rating questions were mandatory. An optional text response was provided to give experts the opportunity to suggest an improved formulation for each statement. At the end of each dimension or sub-

dimension, experts were given the option of proposing new statements. The final resulting questionnaire consisted of 149 questions, 70 of which were mandatory. Pre-testing of the questionnaire suggested a required completion time of 45 minutes for someone unfamiliar with the framework.

Round 1: Data analysis

TEL-eLL definition

21.1% of experts found the proposed working definition perfectly satisfactory. 68.4% found it reasonably satisfactory. 10.5% found it unsatisfactory. A total of 21 reformulations were proposed, 14 of which were considered to be adjustments to the initial definition (changing words and punctuation, omitting words and phrases). The remaining 7 were considered to be major rewording or alternative definitions.

Calculating consensus for the statements

Determining consensus in Delphi studies can be done in several ways, with studies often setting arbitrary consensus thresholds such as 50% in the first round and a higher threshold in subsequent rounds (von der Gracht, 2012). For the first round, Average Percentage Majority Opinion (APMO) was used, where:

> *AMPO = (total number of majority agreement + majority disagreement)/total number of opinions expressed x 100%*

Majority agreement was set at 50% for *highly important + important* on the Likert scale. Majority disagreement was set at 50% for *not important + not at all important*. All statements passed the majority agreement threshold.

The total number of majority agreements was 2160. The AMPO consensus threshold was thus calculated as:

> *(2160+0)/2583 x 100% = 83.7%*

Consensus was thus considered to have been reached on all statements receiving an agreement score of >83.7%.

Overall, by using AMPO, consensus was reached on 39 of the 68 statements (57.35%) in Round 1. These statements were thus considered to have been validated for the final framework, although reformulations still needed to be evaluated by the experts in Round 2. Those statements on which consensus had not been reached were resubmitted in Round 2 for validation, in the initial wording or with a proposed reformulation, or for exclusion from the framework.

Round 2: Survey design

TEL-eLL definition

The 21 reformulations were classed into the two categories of adjustments and major rewordings. For the 14 adjustments to the initial definition, bold typeface and barred text were used to indicate where these changes had been made. Experts were asked to choose their top three definitions: first choice, second choice, third choice.

Statements

For statements which achieved consensus in Round 1 but for which reformulations were proposed, experts were asked either to validate the initial definition or choose one of the reformulations. For statements which did not achieve consensus in Round 1, experts were asked to validate the initial definition, choose one of the proposed reformulations or eliminate the statement from the framework. For the new proposed statements in Round 1, experts were asked to rate these on a 5-point Likert scale as in Round 1. Optional text responses were included at the end of each dimension/sub-dimension for experts to explain their choice, and a final optional text response provided at the end of the survey. In order to support the aim of reaching consensus by the end of Round 3, no new statements were solicited. The resulting questionnaire for Round 2 consisted of 133 questions, 13 of which were optional text responses.

Round 2: Data analysis

TEL-eLL definition

A score of 3 was attributed to definitions selected as first choice. A score of 2 was attributed to definitions selected as second choice. A score of 1 was attributed to definitions selected as third choice. The top 4 definitions (A, C, D and O, presented in Table 1 below) were selected for inclusion in Round 3.

Table 1: The top 4 definitions resulting from Round 2 of the TEL-eLL Delphi study

ID	Definition	Score (Round 2)
(A)	"a set of attitudes, understandings, mindsets and visions which enable leaders in higher education to employ sound judgment for making consistently good decisions for addressing complex problems relating to the integration of technology-enhanced learning and to solve these problems in ways which are respectful of people and the environment; and which contribute to socio-economic development and enhancing the capacity for individual social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change."	18
(C)	"a set of attitudes, understandings and mindsets, including an awareness of how technology changes the traditional paradigms of education, research, scholarship and administration. TEL-eLL should enable leaders in higher education to address complex problems relating to the integration of technology in education, and to solve them in ways which are respectful of people and the environment and which contribute to socio-economic development and to developing the capacity for social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change."	24
(D)	"a set of attitudes, understandings and mindsets which enable leaders in higher education to address complex problems relating to the integration of technology-enhanced learning."	20

(O)	"a set of attitudes, understanding, and mindsets that empower leaders in higher education with skills to practice foresight, insight, and action to address complex problems in relation to the integration of technology-enhanced learning."	16

Statements and reformulations

At the end of Round 2, consensus was reached on 66.67% of the new statements that experts had proposed in Round 1. Three of the original statements were also validated outright, the others being reformulations which resulted in a significant dispersion of responses. This raises the issue of the complexity of this study, with experts being able to introduce nuance and additional ideas, rather than being driven towards a 'forced' consensus by the nature of the study itself.

Round 3: Survey design

TEL-eLL definition

The top 4 definitions (A, C, D and O) were put to experts again, with the option of not aligning with the consensus, on condition that they justified their choice.

Statements

The Round 3 survey included only the statements which did not achieve consensus in Round 2. For each statement, experts were presented with the results from Round 2 in graph form. To avoid dispersion of the answers in Round 3, only the reformulations which achieved a score of >20% were included, while leaving experts the option of choosing "other" so as not to force their hand. This questionnaire consisted of 89 obligatory questions.

Overall results

Forty-eight (42.48%) of those contacted signed up for the Delphi study and thirty-eight (79%) of these actually completed Round 1. Of these thirty-one (82%) completed both Rounds 2 and 3. This represents a reasonable response rate at sign-up stage, and an excellent rate of Round 1 participation compared to sign-up, as well as an excellent continuation rate, helped by regular polite reminders and a certain amount of flexibility accorded to experts who requested an extension of the deadline. In particular, for the validity of the study, it was important that all those who contributed in Round 2 also completed the final round.

TEL-eLL definition

The final result was an absence of any clear-cut consensus, but which favoured the most concise, general definition of TEL-eLL (D = 41.9%) as "a set of attitudes, understandings and mindsets which enable leaders in higher education to address complex problems relating to the integration of technology-enhanced learning". Furthermore, referring back to Table 1, we can see that the second-choice definition (C), which obtained a score of 32.3% in Round 3, actually includes Definition D. It is thus important to both retain a workable, understandable general definition (D), while taking care not to neglect the additional issues addressed by nearly one third of the experts, namely: "an awareness of how technology changes the

traditional paradigms of education, research, scholarship and administration; and solving these problems in ways which are respectful of people and the environment and which contribute to socio-economic development and to developing the capacity for social awareness and critical reflection (within and beyond the institution) as a basis for personal and social change."

TEL-eLL framework

The final overall framework consists of 69 statements, with 4 of the original and 6 of the new statements having been eliminated. The structure of the framework including the number of statements and the main themes addressed within each of the dimensions or sub-dimensions is presented in Table 2 below.

Table 2:   Summary of TEL-eLL framework

DIMENSION	SUBDIMENSION	MAIN THEMES
WORLDLY (29)	e-leadership visioning (13)	Informed decision making; Clear vision of institutional mission; Creating an open and respectful environment for discussion; Involving external stakeholders.
	Self-relationship with technology (9)	Healthy embracing of digital technologies; Ethics, cybersecurity; Critical digital literacy; Awareness of research on student use of media.
	Self-relationship with teaching and learning (7)	Understanding different learning theories and approaches; Design thinking for pedagogy; Affordances and potential risks of TEL.
SUSTAINING (8)		Human and environmental implications; Access, equity and inclusion; Safe, legal and ethical use of TEL; Learning spaces; Social good, digital citizenship, open education.
LEADINGFUL (15)	Leadership style (13)	Creating conditions for innovation and change; Risk-taking; Change management; Distributed leadership, empowering others.
	Branding and Public Relations (2)	Promoting open forms of education; Positive brand image emphasising the quality of teaching and learning supported by technology.
RELATIONAL (10)		Shared vision, meaning and purpose; Managing relationships; Trust, positive affect and caring; Managing divergences and differences, while still being able to make a decision in the absence of consensus.
LEARNINFUL (7)	Leader as learningful self (4)	Formal and informal learning for leadership, change management, information literacy and critical digital literacy; Learning the art of delegation.
	Learningful	Reward mechanisms aligned with competencies for

community (3)	change;
	Digital scholarship (teacher and staff development);
	Organisational culture of learning and innovation.

Conclusion

This paper describes Phase 1 of a wider research study, which entailed developing a TEL-eLL framework via a Delphi study in three rounds. This framework is applied in the three Mixed Methods Case Studies which form Phase 2 of the research, exploring the lived experiences of key informants in three European campus-based universities with respect to TEL leadership. The framework is also applied in Phase 3, to analyse existing leadership development programmes and to develop recommendations for the explicit integration of TEL-eLL in future programmes.

References

1. Ahlquist, J. (2014). Trending now: Digital Leadership Education using Social Media and the Social Change Model. *Journal of Leadership Studies, 8*(2), 57–60. https://doi.org/10.1002/jls

2. Bates, A. W. (Tony), & Sangrà, A. (2011). *Managing technology in higher education: Strategies for transforming teaching and learning.* John Wiley & Sons.

3. Beaudoin, M. (2016). Issues in Distance Education: A Primer for Higher Education Decision Makers. *New Directions for Higher Education, 173*, 9–19. https://doi.org/10.1002/he

4. Belshaw, D. (2014). *The Essential Elements of Digital Literacies.* https://doi.org/10.1007/s13398-014-0173-7.2

5. Brown, C., Czerniewicz, L., Huang, C.-W., & Mayisela, T. (2016). *Curriculum for Digital Education Leadership: A Concept Paper.* Retrieved October 30, 2017, from http://oasis.col.org/handle/11599/2442

6. Dalkey, N., & Helmer, O. (1963). An Experimental Application of the Delphi Method to the Use of Experts. *Management Science (Pre-1986), 9*(3), 458–467.

7. Davis, H. (2012). *Leadership Literacies for Professional Staff in Universities.* RMIT University. Retrieved from https://researchbank.rmit.edu.au/view/rmit:160335

8. von der Gracht, H. A. (2012). Consensus measurement in Delphi studies. Review and implications for future quality assurance. *Technological Forecasting and Social Change, 79*(8), 1525–1536. https://doi.org/10.1016/j.techfore.2012.04.013

9. Hsu, C.-C., & Sandford, B. A. (2007). The Delphi technique. *Practical Assessment, Research & Evaluation, 12*(10), 1–8. https://doi.org/10.1576/toag.7.2.120.27071

10. Jameson, J. (2013). E-Leadership in higher education: The fifth "age" of educational technology research. *British Journal of Educational Technology, 44*(6), 889–915.

11. Johansen, R. (2012). *Leaders make the future: Ten new leadership skills for an uncertain world* (2nd ed.). San Francisco, CA: Berrett-Koehler Publishers.

12. Lewis, J. (2015). *The Academic Library in the 21st Century: Competencies Library Directors and Senior Managers Must Possess to Successfully Lead Their Organizations into the Future.*

13. Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Sage.

14. Linstone, H. A., & Turoff, M. (1975). *The Delphi method: Techniques and applications* (Vol. 29). Addison-Wesley Reading, MA.

15. Orr, T., & Cleveland-Innes, M. (2015). Appreciative leadership: Supporting education innovation. *International Review of Research in Open and Distributed Learning, 16*(4), 235–241.

16. Pawlowski, S. D., & Okoli, C. (2004). The Delphi Method as a Research Tool: An Example, Design Considerations and Applications. *Information & Management, 42*(1), 15–29. https://doi.org/10.1016/j.im.2003.11.002

17. Sheninger, E. (2014). *Digital Leadership: Changing Paradigms for Changing Times.* Thousand Oaks, CA: Corwin, Sage Publications.

18. Whited, J. E. (2007). *Identifying required skills for virtual team leaders: A Delphi method study.* University of Phoenix.